

### **REMARKS**

Claims 65-77 are presently pending in this application. No claims have been amended in this Response.

In the Office Action mailed July 9, 2007, claims 65-77 were rejected. More specifically, the status of the claims in light of this Office Action is as follows:

(A) Claims 65-77 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,642,786 issued to Hansen. ("Hansen"); and

(B) Claims 65-77 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,363,940 and claims 1-8 of U.S. Patent No. 6,698,433.

A. Response to Section 102/103 Rejections—Hansen

Claims 65-77 were rejected under 35 U.S.C. § 102 over Hansen. Independent claims 65, 69, 70, 74, 75, 76, and 77 are directed towards systems for locating a target volume in a patient. The system of claim 65, for example, includes a first active marker, a second active marker and a detector. The first active marker has a body without external lead wires projecting therefrom, the body has a biocompatible capsule having a section with a diameter of 1-2 mm. The first and second active markers generate detectable energy in response to an excitation energy. The second active marker is positionable relative to the first active marker. The detector is configured to receive the detectable energy generated by the first and second active markers. For the reasons set forth below, the pending claims are novel and non-obvious over Hansen because (a) Hansen does not disclose all of the claimed features, and (b) Hansen's system is fundamentally flawed for using small retransmitters in human patients such that a person skilled in the art of implantable medical devices would not be motivated to modify or otherwise use Hansen's retransmitters with Hansen's transmitter/receiver/comparator system to come up with the claimed subject matter.

Claims 65-77 are patentable over Hansen under Section 102 because this reference fails to disclose several features of these claims. More specifically, Hansen discloses a system having a transmitter that generates an alternating magnetic field (transmitter field), a retransmitter that generates a retransmitter field in response to the transmitter field, a receiver for measuring the transmitter and retransmitter fields, and a comparator for determining a value related to the field strength of the retransmitter field. First, Hansen fails to disclose or suggest a marker including a biocompatible capsule with a section having a diameter of 1-2 mm. Instead, as the Examiner correctly points out in the Office Action, Hansen fails to disclose the markers as having a diameter of 1-2 mm. Further, Hansen does not disclose having any type of body or capsule encasing its retransmitters. Moreover, Hansen only discloses cubical retransmitters (Figures 3, 4, and 6). Hansen accordingly does not disclose a first active marker including a body without external lead wires projecting therefrom comprising a biocompatible capsule having a cylindrical section with the diameter of 1-2 mm that is configured to fit in a standard implanter needle for implantation in the patient.

Claims 65-77 are also patentable over Hansen under Section 103 because a person skilled in the art would not be motivated to modify or otherwise use Hansen's retransmitters with Hansen's transmitter/receiver/comparator system for markers having a cylindrical section with a diameter of 1-2 mm. Hansen is fundamentally flawed for using very small transmitters in human patients. More specifically, although Hansen teaches a system for locating an object using a magnetic field, it would not have been possible or practicable to measure the signal strength of a marker having a cylindrical section with a diameter of 1-2 mm with Hansen's system. First, the field strength of Hansen's retransmitter is, in part, a function of the number of windings in the coil and the size and material of the core. The field strength for a retransmitter having a diameter as claimed would be on the order of 100pT (i.e.,  $10^{-10}$  Tesla) at a distance of one meter. Second, to induce enough voltage in the circuit of such a small retransmitter, the transmitter must generate a magnetic field on the order of 300 $\mu$ T ( $3 \times 10^{-4}$  Tesla) at the retransmitter. The field strength of the transmitter field is accordingly several orders of magnitude larger than

that of the retransmitter field. Third, Hansen teaches that the transmitter operates continuously while the receiver senses the strength of the transmitter field and the retransmitter field combined. (Hansen, Col. 22, lines 13-25.) The value that the receiver provides to the comparator is accordingly the sum of the transmitter field, the retransmitter field, and any other interfering magnetic fields or electronic noise. A person skilled in the art would recognize that the signal from a retransmitter with a 1-2 mm cylindrical section cannot be distinguished with the requisite accuracy from noise or other interference. As such, the location of small implantable retransmitters computed by Hansen's system would be unreliable and subject to errors.

Moreover, assuming for the sake of argument that it would be practicable to measure the location of a retransmitter having a volume of  $15 \text{ mm}^3$  using Hansen's system, a person skilled in the art would not be motivated to make an implantable marker having a 1-2 mm cylindrical section based on Hansen's teachings. Hansen teaches only a cubic retransmitter with a minimum volume of  $15 \text{ mm}^3$  such that each side of the cube has a minimum length of approximately 2.465 mm. (Hansen, Col. 26, lines 5-8, and Figures 3, 4 and 6.) If such a cubic retransmitter were housed in a cylindrical section of a capsule, the diameter of such a cylindrical section would be approximately 3.486 mm (i.e., the diagonal dimension of a face of a 2.465 mm cube). The drop off in signal from a retransmitter having a diameter of 3.486 mm to one having a diameter of 2.0 mm is approximately 89 percent. As a result, modifying the smallest retransmitter disclosed in Hansen would significantly exacerbate the signal to noise problem of the system disclosed in Hansen. A person skilled in the art would thus be deterred from reducing the size of Hansen's retransmitter to the claimed diameter of 1-2 mm. Claims 65-77 are accordingly patentable over Hansen under § 103 because it would not have been obvious at the time of the invention to modify the retransmitter in Hansen to be contained within a biocompatible body having a cylindrical section with a diameter of 1-2 mm for the reasons explained above.

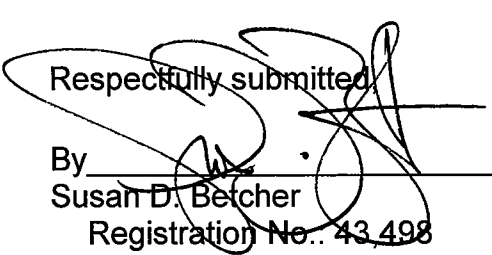
B. Response to Nonstatutory Double Patenting Objection

Claims 65-77 were rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,363,940 and claims 1-8 of U.S. Patent No. 6,698,433. Applicant submits herewith a terminal disclaimer in accordance with 37 CFR 3.73 (b) for U.S. Patent Nos. 6,363,940 and 6,698,433 thus rendering the objection moot.

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. The applicants accordingly request reconsideration of the application and a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite the prosecution of this application, the Examiner is encouraged to call the undersigned representative at (206) 359-6088.

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Respectfully submitted,

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